

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

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| Massachusetts Electric Company |) | DPU 96-25 |
| Restructuring Settlement Agreement |) | |
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Testimony of Alan J. Noguee
Senior Energy Analyst
Union of Concerned Scientists

on behalf of

UNION OF CONCERNED SCIENTISTS
2 Brattle Square
Cambridge, MA 02238
(617-547-5552)

November 21, 1996

Massachusetts Electric Restructuring Settlement Agreement, DPU 96-25
Testimony of Alan J. Noguee -- 2

1 **Q Please state your name and work address.**

2 A My name is Alan J. Noguee, Union of Concerned Scientists, 2 Brattle Square, Cambridge,
3 Massachusetts 02238.

4 **Q What are your current job responsibilities and qualifications?**

5 A I am a Senior Energy Analyst at the Union of Concerned Scientists (UCS). The Union of
6 Concerned Scientists is a non-profit public interest organization dedicated to advancing
7 responsible public policies in areas where technology plays a critical role. It has had an active
8 energy research program for many years. My principal responsibilities are to conduct and
9 supervise analysis and advocacy related to the development of sustainable energy resources in
10 New England, particularly in relationship to the restructuring of the electric utility industry.

11 I had been an energy analyst and advocate for over 16 years before joining UCS in May
12 1994. Previously, I was Energy Program Director and an energy analyst with the Massachusetts
13 Public Interest Research Group (MASSPIRG) , where I was responsible for the organization's
14 research, litigation, legislative policy and public relations on energy policy issues in
15 Massachusetts. Prior to joining MASSPIRG, I was an energy analyst for the Environmental
16 Action Foundation in Washington, D.C, and research coordinator for an energy advocacy group
17 in Philadelphia, Pennsylvania. In each of these positions, I have been responsible for monitoring
18 developments in renewable energy options for utilities.

19 I prepared UCS' written comments and testified orally on renewable energy issues in the
20 Massachusetts restructuring docket, DPU 96-100. I have testified on renewable energy in
21 restructuring before the New Jersey Board of Public Utilities on behalf of the Natural Resources
22 Defense Council, the mid-Atlantic Energy Project, and a coalition of more than 50 community
23 organizations. I have submitted testimony on renewable energy in utility Integrated Resource
24 Planning proceedings on behalf of the Conservation Law Foundation in Massachusetts, New
25 Hampshire and Connecticut. In July 1996, I was invited to present my analysis of New England
26 renewable energy targets and costs at a U.S. Department of Energy ("DOE") Office of Utility
27 Analysis Workshop, in Washington DC. I have been involved in multi-party discussions on
28 renewables in restructuring in Massachusetts, Maine, Vermont, Rhode Island, New Jersey,

1 Pennsylvania and California. A copy of my resume is appended as Exhibit AJN-1..

2 **Q What is the purpose of your testimony?**

3 A I am testifying in support of the renewable energy provisions of the Massachusetts Electric
4 Restructuring Settlement Agreement. I will testify that the renewable energy provisions are
5 reasonable in terms of:
6 the Department of Public Utilities (“DPU”) order and proposed regulations of May 1, 1996 and
7 previous DPU precedent;
8 • the market barriers and failures facing renewable energy in restructured electricity generation
9 markets, and the benefits to utility customers of provisions to overcome those barriers; and
10 policies which have been approved and proposed in other jurisdictions.
11 I incorporate into my testimony by reference the Initial Comments of the Union of Concerned
12 Scientists submitted in DPU 96-100, on April 12, 1996, Second Round Comments filed May 24,
13 1996, and Final Comments/Brief submitted on August 2, 1996. 220 CMR 1.10 (2). These
14 comments were prepared by me, and I attest that they are true and accurate to the best of my
15 knowledge and ability.

16 **Q Please describe how the settlement is reasonable in terms of the DPU order and proposed**
17 **regulations of May 1, 1996 and previous DPU precedent?**

18 A In its May 1 order, the DPU proposed a Renewables Fund which would be supported through a
19 system benefit charge suggested at one mill per kWh. The heart of the renewables provisions of
20 the Restructuring Settlement Agreement is a system benefit charge to develop and acquire new
21 clean and renewable technologies. The charge starts at 0.25 mills per kWh in 1998, and
22 increases to 0.55 mills per kWh in 1999, 0.85 mills per kWh in 2000, and 1.25 mills per kWh in
23 2001. Funding after 2001 would be determined by the DPU based on a recommended goal of
24 adding new renewables equal to four percent of Massachusetts kWh sales by the end of 2007.

25 Over the four years that specific funding levels are defined in the RSA, the renewables
26 system benefit charge (“SBC”) would average 0.725 mills per kWh. At an assumed sales growth
27 rate of 1.44 percent, the present value of total funding over the four years would equal
28 approximately 69 percent of the Department’s recommended level. Assuming that the SBC were

1 to continue at the 2001 level of 1.25 mills through the year 2007, the present value of the ten year
2 total would equal approximately the same amount that would be realized by ten years of a SBC at
3 1.0 mills per kWh.

4 The RSA system benefit charge is thus reasonable in terms of the DPU's proposed order.
5 The settlement has the advantage of reducing the cost of the renewables program to distribution
6 company customers during the early years, when stranded cost recovery is higher. The ramp-up
7 of renewables, combined with the RSA demand-side management ("DSM") proposal, also
8 permits the total system benefit charge for DSM plus renewables and to remain flat at today's
9 level, which may be considered an advantage by some parties.

10 The renewables ramp-up does create substantial regulatory risk for renewables developers,
11 compared to the flat charge proposed by UCS in our DPU 96-100 comments and by the DPU in
12 its May 1 order. Future regulatory commissions or legislatures could reduce or cut eliminate the
13 charge before the present value of the RSA renewables charge breaks even with a flat 1 mill
14 charge, leaving renewables development short of the goal anticipated in the RSA or implicitly in
15 the Department's order. I view this risk as acceptable, however, given the settlement's inclusion
16 of the recommended goal for renewables as a percentage of total sales to Massachusetts
17 electricity customers to guide future funding levels.

18 All witnesses on the renewable panel in DPU 96-100, including myself, agreed that it is
19 reasonable to review the funding levels, and renewables goals, after a period of years. The four
20 year renewables ramp-up in the RSA permits gives the DPU great flexibility to adjust funding
21 levels after 2001 to respond to a wide range of conditions and program results over the first four
22 years. One additional year's increase at the preceding year's ramp-up rate would place the charge
23 in the middle of the one to two mill range supported by UCS in our testimony in DPU 96-100.
24 A similar decrease could reduce the charge to one mill proposed by the DPU, or below, if
25 renewables price reductions and/or performance in the market are exceeding expectations, and
26 higher funding levels are not necessary to meet the recommended goal. The Department would
27 also retain the flexibility to adjust the goal, if appropriate.

28 The Department has encouraged "the stakeholders to work together toward consensual

1 resolution of the issues.” (DPU 96-100, Notice of August 9, 1996) The Massachusetts Electric
2 settlement accomplishes that objective for renewables for renewables, in a manner consistent
3 with the Department’s order of May 1, 1996. I would note that the Center for Energy and
4 Economic Development (“CEED”), which has questioned the renewables provisions in the RSA,
5 participated in DPU 96-100, including the filing of written comments in that proceeding. So far
6 as I am aware, CEED raised no questions about or objections to a system benefit charge for
7 renewables, or to the Department’s specific proposal, at any phase of that proceeding.

8 Allowing utilities to charge all customers for above-market costs for new renewables
9 development is also consistent with Department precedent from the Massachusetts Electric
10 “Green RFP,” DPU 94-49. In that proceeding, the DPU approved above-market contracts with
11 renewable energy facilities to help commercialize new technologies and acquire their system
12 benefits for all customers.¹ The system benefit charge in the RSA simply pre-approves (and
13 limits) total above-market spending for renewables acquisition. Such pre-approval is also
14 consistent with Department policy for DSM programs.

15 **Q Please explain how the RSA is reasonable considering the market barriers and failures**
16 **facing renewable energy in restructured electricity generation markets, the potential**
17 **mechanisms to overcome them, and the benefits of the renewables provisions to**
18 **Massachusetts Electric customers?**

19 **A** Renewable energy technologies face a number of barriers in competing fairly with conventional
20 generating technologies in a deregulated generation market. These barriers are discussed in some

¹ “The Department recognizes that the renewable energy resources selected by the Company provide environmental and resource planning benefits. In addition to these benefits, the Department also recognizes that renewable resources have the potential to provide a measure of diversity to the Company’s existing resource portfolio. The value of a diversified resource portfolio lies in its ability to provide “insurance” to ratepayers against costs associated with future uncertain developments (e.g., environmental regulation, availability of fuel supply, and fuel costs). The value of a resource that provides diversity lies in its ability to mitigate the impact of potential future costs and the potential magnitude of those future costs, and to contribute to system reliability should any particular fuel sources become unreliable.” (DPU 94-49) The Department also recognized the “learning value” of the Green RFP projects to the utility.

1 detail in my comments in DPU 96-100. (Initial Comments, pp. 5-7). The barriers include:
2 market transaction barriers, such as lack of customer information, lack of access to capital, and
3 split incentives (e.g., landlords own buildings, tenants pay energy bills). These barriers are
4 virtually identical to those faced by DSM measures, which led to the Department decisions
5 authorizing utility DSM programs in the DPU 86-36 proceeding.

- 6 • commercialization barriers faced by new technologies which have not yet developed regional
7 infrastructures for resource prospecting, siting, permitting, installing, maintaining, and
8 operating facilities; which have not yet achieved mass production volumes; and which have
9 not enjoyed the decades of research, development and construction tax subsidies provided to
10 fossil fuel and nuclear technologies.
- 11 • market failures to value long-term benefits and public goods, where individual renewables
12 purchase decisions create benefits for all utility customers – increased fuel diversity, fuel
13 price and supply risk mitigation, reduced risk of environmental regulatory costs, accelerated
14 commercial availability of cost-effective generating options, as well as economic
15 development benefits to the region as a whole.

16 Unless these barriers are addressed, the electricity generation market will not function
17 efficiently to incorporate the potential long-run benefits of renewables, and electricity customers
18 will likely face higher long-run electricity costs. The benefits of renewable energy generation
19 were elaborated in our comments in DPU 96-100 (Initial Comments, Exhibit UCS-2, pp. 3-5;
20 Second Round Comments, Exhibit UCS-3, pp. 2-3). The benefits include:

- 21 • diversity and energy security benefits, such as reduced fuel supply risks and price volatility
22 associated with resources which use indigenous, renewables fuels or no fuels. Deregulated
23 generation markets are likely to aggravate diversity concerns, as many customers will seek
24 the fuel with the lowest immediate cost. Over-reliance on one or two fuel sources will
25 increase price pressure on those fuels for all customers, increase risks to system reliability in
26 case of fuel supply interruptions or price spikes;
- 27 • environmental risk-mitigation benefits, reducing costs to all customers from over-relying on
28 expensive environmental backfits to respond to piecemeal emerging environmental

1 regulations;² for example, the U.S. Environmental Protection Agency issued an advance
2 notice of proposed rulemaking on May 31, 1996 indicating its intention to consider more
3 stringent ground-level ozone and particulate matter standards. A final decision is scheduled
4 for mid-1997.

- 5 • technology advancement and learning benefits, increasing the availability of cost-effective
6 generating options for all customers (see especially Final Comments/Brief, Exhibit UCS-4, p.
7 4, footnote 1, explaining how renewables support from all customers especially benefits large
8 customers);
- 9 • economic development, from the creation of new “green” manufacturing, installation, and
10 maintenance jobs and the retention of energy revenues in the local economy. Among other
11 benefits, increased economic development which results in new companies and new
12 employees in the state could reduce stranded cost charges for other customers.

13 Because a number of renewable energy technologies can be installed in or near sources of
14 load, such as customer facilities, these technologies can also reduce system transmission and
15 distribution (“T&D”) costs and increase system reliability. UCS’ 1995 *Renewing Our*
16 *Neighborhoods* study found that these benefits in some distribution-constrained neighborhoods in
17 the Boston Edison service territory may even be as high as avoided capacity and generation
18 benefits. Studies of other utility systems in different parts of the country have also found
19 significant benefits from distributed resources. Under performance-based ratemaking,
20 distribution companies have some incentive to utilize renewables system benefit charges in a
21 way that will maximize avoided distribution costs for all customers. The Mass. Electric RSA
22 also explicitly includes a provision for distributed utility pilot programs in 1997, and the
23 implementation of operational procedures to avoid T&D costs as soon as practical. This

1 ² I am not referring here to the concept of environmental externalities, the damage to the environment
2 and public health from energy-related emissions. Rather, I refer to the likelihood that costs become
3 internalized at a future date through new environmental regulations, directly increasing utility costs as a
4 result of required capital additions, operation and maintenance changes, or fuel-switching leading to
5 higher fuel costs. While there may be additional external benefits as a result of developing renewables,
6 these are beyond the scope of this testimony.
7

1 provision should help to ensure that SBC funds are cost-effectively leveraged to increase these
2 benefits.

3 **Q Have you quantified these benefits for the Mass. Electric RSA?**

4 A No. It is not possible or necessary to precisely determine the quantitative benefits of the RSA
5 renewables provisions at this time. The mix of clean and renewable resources, including the
6 relative proportion of technologies that are at near-market prices versus those that are less
7 commercially developed, is not specified in the settlement. The RSA states that spending plans
8 for renewables will be approved by the Department based on collaborative input. The
9 Department, therefore, retains full authority to disapprove any proposal or mix of proposals that
10 it finds would not provide sufficient benefits to Massachusetts Electric customers. Should the
11 collaborative input or DPU decision determine that there are insufficient opportunities to spend
12 the entire budget on projects which are likely to provide benefits to utility customers, the RSA
13 provides for carrying over renewables funding to a subsequent year.

14 UCS analysis, presented in DPU 96-100, found that a renewables SBC of one to two
15 mills per kWh would be a reasonable contribution from New England states toward the sustained
16 orderly development of the clean and renewable technologies likely to produce the most
17 significant long-run savings for the region (Second Round Comments, pp. 10-12). First, we first
18 looked at the national production levels needed to enable the cost of renewables generation costs
19 to continue to decline steadily for wind, photovoltaics, advanced biomass and fuel cell
20 technologies. Second, we determined a reasonable market share for New England, based on
21 “early market” potential for each technology in New England compared to the U.S. We found
22 that a goal of adding new renewables equal to four percent of sales over a ten year period in New
23 England would provide sufficient market pull, combined with demand other regions, to continue
24 the sustained orderly development of these technologies. Third, we determined that a nominal
25 levelized system benefit charge in the range of one to two mills per kWh for ten years would
26 likely be needed to achieve that goal.³

¹ ³ We testified in DPU 96-100 that our recommended SBC was doubly front-loaded: first, to allow a buy
² down of capital costs for renewables coming on-line each year; and second, to maintain a flat charge

1 The resulting “model renewables commercialization portfolio” (Second Round
2 Comments, Table 1) is not intended to be a fixed blueprint for SBC spending, but an illustration
3 of one reasonable path for supporting renewables development in New England.⁴ Actual
4 spending should and will be adjusted based on changing circumstances. The settlement
5 agreement also does not specify whether funds will be used for research and development,
6 demonstration projects and/or buying down above-market costs of new renewables projects. It
7 neither requires nor prohibits any of these options, deferring those decisions to collaborative
8 input subject to DPU approval.

9 **Q Please explain how the RSA is reasonable in terms of policies which have been approved**
10 **and proposed in other jurisdictions.**

11 **A**Over the four years for which there are committed renewables funding levels, the RSA system
12 benefit charge averages the same as the low end of the SBC range authorized by California
13 restructuring legislation passed in August 1996. That bill authorized funding of \$465 million to
14 \$540 million for renewables over four years, equivalent to a SBC of 0.73 - 0.84 mills per kWh
15 for renewables. In addition the California legislation authorized \$250 million for public interest
16 research and development, some of which is expected to be used to fund renewables. The Mass.
17 Electric SBC for renewables averages 0.73 mills per kWh over four years.

18 In DPU 96-100, we showed that the proposed goal of adding new fuel cells and
19 renewables equal to four percent of sales over four years was less than or comparable to earlier
20 renewables goals adopted in California, Minnesota, Iowa, and the United Kingdom. The goals
21 associated with photovoltaics and wind in our model renewables commercialization portfolio are
22 also less than or comparable to goals for these technologies adopted by a number of our

1 over time. We also testified that an SBC that tracked increasing renewables commitments would be a
2 reasonable alternative (Final Comments, p. 8). The RSA ramp-up is sufficient to buy down the capital
3 costs of renewables coming on line at about the same rate assumed in our flat one mill per kWh scenario.
4

1 ⁴ The inclusion of the kWh sales goal in the RSA should not be construed as an endorsement by settling
2 parties of either the specific portfolio or of the specific assumptions that went into deriving it, but an
3 endorsement that the overall goal and SBC is viewed as reasonable in the light of all available evidence.

1 international competitors. (Second Round Comments, p. 12; Figure 1, Figure 2; Initial
2 Comments, Figure 2).

3 The Massachusetts Electric Restructuring Settlement Agreement provisions for renewable
4 energy are reasonable in terms of Department policy, benefits to the utility's customers, and other
5 jurisdictions. It is supported by a wide range of Massachusetts stakeholders, and should be
6 approved by the Department.

7 **Q Does this conclude your testimony?**

8 **A** Yes, thank you.

CERTIFICATE OF SERVICE

I hereby certify that I have, on this date, caused the foregoing document to be served by hand delivery or fax and by first class mail to Massachusetts Electric Company, the Attorney General, the Center for Energy and Economic Development, and Xenergy, and by first class mail to all other parties on the Service List.

Dated: November 21, 1996

Alan J. Noguee
Senior Energy Analyst
Union of Concerned Scientists

Exhibit AJN-1

ALAN J. NOGEE
UNION OF CONCERNED SCIENTISTS
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PROFESSIONAL EXPERIENCE

Senior Energy Analyst, Union of Concerned Scientists (UCS), June 1994 - present.

Conduct and supervise research and analysis; develop and present technical and policy papers, testimony, and other material in various legislative, regulatory, and public arenas; collaborate with utilities, policy-makers and other stakeholders to develop sustainable energy strategies; monitor and participate in regulatory litigation.

Energy Program Director, Massachusetts Public Interest Research Group, 1989 - 1994. (Energy Policy Analyst, 1987 - 1989.)

Advocacy and analysis on energy issues for the state's largest environmental and consumer protection organization: regulatory litigation, negotiation, research, testimony, writing, lobbying, press relations and public speaking; with emphasis on energy efficiency, forecasting, integrated resource management, renewables, and coal and nuclear plant economics.

Energy Analyst, Environmental Action, Washington, DC, 1982 - 1986.

Research on energy demand and supply, nuclear power and utility regulation; testimony, public speaking, writing; advising citizens' groups and government officials on issues in utility regulation and legislation; organizing training conferences for state energy advocates; and maintaining a clearinghouse of resource materials.

Research Coordinator, Keystone Alliance, Phila., PA, 1978 - 1982.

Safe energy advocacy in regulatory and legislative forums; research, writing and speaking; coalition and community organizing.

Resources Coordinator, Mobilization for Survival National Office, Philadelphia, PA, 1977 - 1978.

Editing and writing newsletter, maintaining clearinghouse on nuclear power and weapons, energy alternatives, human needs.

EDUCATION AND TEACHING

Adjunct Faculty, "Consumer Energy Advocacy," Center for Community Planning, Univ. of Massachusetts at Boston, Winter 1990.

Research and teaching assistant, Experimental and Biological Psychology, doctoral program, Univ. of Cal., Berkeley, 1971 - 1973.

B.A., summa cum laude in Psychology, Brandeis University, 1971.

PROFESSIONAL AFFILIATIONS

Massachusetts Fuel Cell Commercialization Working Group, Division of Energy Resources, 1995 - present.

Economic Development Task Force, State Energy Plan, Massachusetts Division of Energy Resources, 1992 - 1993.

Massachusetts Photovoltaics for Utilities Task Force, 1992 - present.

Commonwealth of Massachusetts Integrated Resource Management General Advisory Committee, 1990 - present.

Governor's Advisory Committee on Energy, 1990.

MIT Energy Laboratory Analysis Group for Regional Electricity Alternatives, 1990 - 1995.

Associate, National Environmental Law Center, Boston, 1990 - 1994.

Technical Advisory Committee, Mass. Division of Energy Resources, State Annual Forecast of Energy Resources, 1989 - 1994.

Boston Edison Demand-Side Management Settlement Board, 1989 - 1994.

Massachusetts Utilities Demand-Side Management Collaborative Oversight Group, 1988 - 1990.

Advisory Board, Mass. Citizens for Safe Energy, 1988 - 1992.

Executive Committee, Board of Directors, New England Energy Policy Council, Boston, 1987 - 1989.

President, Board of Directors, Safe Energy Communication Council, Washington, D.C., 1985 - 1986.

Board of Directors, Energy Conservation Coalition, Washington, D.C., 1983.

Chairperson, Coalition to Fight the PECO Rate Hike, 1980 - 1982.

PUBLICATIONS

Author of numerous reports, articles and presentations on energy policy and consumer protection. Detailed list available on request.

REGULATORY PROCEEDINGS

Testimony on behalf of The Mid-Atlantic Energy Project, Natural Resources Defense Council, The R.E.A.L. Energy Coalition, Energy Master Plan Phase II, New Jersey Board of Public Utilities, August 7, 1996

Final Comments/Brief, of the Union of Concerned Scientists, Massachusetts Electric Utility Restructuring, DPU 96-100, August 2, 1996.

Second Round Comments of the Union of Concerned Scientists, Massachusetts Electric Utility Restructuring, DPU 96-100, May 23, 1996

First Round Comments of the Union of Concerned Scientists, Massachusetts Electric Utility Restructuring, DPU 96-100, April 12, 1996

Pre-Filed Testimony on behalf of Conservation Law Foundation, Inc., Connecticut Light & Power, Integrated Resource Planning, Docket No. 94-04-01, December 13, 1994.

Pre-Filed Testimony on behalf of Conservation Law Foundation, Inc., Public Service of New Hampshire Integrated Least Cost Resource Plan, Docket No. 94-080, October 3, 1994.

Pre-filed Testimony on behalf of Conservation Law Foundation, Inc., Boston Edison Integrated Resource Management Proceeding, DPU 94-49, August 26, 1994.

Represented MASSPIRG in regulatory proceedings, including discovery, cross-examination, motions, oral argument, briefs, and settlement negotiations:

Western Mass. Electric Demand-Side Management Pre-Approval, DPU 92-88-A, 1993.

Commonwealth Electric Integrated Resource Management (IRM/DSM RFP), DPU 91-234-A, 1993.

Boston Edison DSM Pre-Approval, DPU 91-233, 1993.

Boston Edison Rate Case, Dept. of Public Utilities, DPU 92-92, 1992.

Boston Edison DSM Pre-Approval, DPU 92-131, 1992.

Environmental Externalities, DPU 91-131, 1991 - 1992.

Petition of Boston Edison to Defer RFP3, DPU 90-270, DPU 92-130, 1991 - 1992.

Western Massachusetts Electric IRM, DPU 92-88/EFSC 92-17, 1992.
 Massachusetts Electric IRM, DPU 91-114/EFSC 91-24, 1992.
 Silver City Energy Limited Partnership Siting Investigation, EFSC 91-100, 1992.
 Boston Edison Long-Range Forecast/Edgar Energy Park, Energy Facilities Siting Council, EFSC 90-12/12A, 1990 - 1992.
 Boston Edison Demand-Side Management Pre-Approval, DPU 90-335, 1991.
 Requests for Proposals of the Western Mass. Electric Co., the Boston Edison Co. and Eastern Utilities Associates, DPU 90-270, 1990 - 1991.
 "Economic Performance Incentive Regulation for Nuclear Power Plants," Comments of the Massachusetts Public Interest Research Group to the U.S. Nuclear Regulatory Commission, December 12, 1990.
 Comments on Proposed Rule on Nuclear Power Plant License Renewal to the U.S. NRC, MASSPIRG, October 15, 1990.
 Comments on Integrated Resource Management Regulations, EFSC 90-RM-100, September, 1990.
 Comments on Integrated Resource Management Regulations, 220 C.M.R. 10.00, DPU 89-239/DPU 86-36-G, May, 1990.
 Boston Edison Rate Case, DPU 89-100, 1989.
 Boston Edison Pilgrim Economics Investigation, DPU 88-48, 1989.
 Boston Edison Pilgrim Outage Investigation, DPU 88-28, 1989.
 Boston Edison Long Range Forecast, EFSC 88-12, 1989.
 Proposed Rule (220 C.M.R. 9.00) for Cost Recovery for Major Incremental Electric Company Generation Investments, DPU 86-36C, July, 1988.
 Investigation of the Adequacy of Plans and Actions of [Massachusetts Electric Utilities] to Ensure Reliable Service in the Summer of 1987 and Thereafter, DPU 87-169, 1988.
 "Least-Cost Electricity Planning in Massachusetts," Investigation by the Massachusetts Department of Public Utilities, D.P.U. 86-36B, December, 1987.
 "Risk and Responsibility: The Used and Useful Principle in Utility Regulation," Investigation by the Massachusetts Department of Public Utilities, D.P.U. 86-36A, September 1987.

LEGISLATIVE HISTORY

Presented testimony regarding legislation concerning energy policy, utility regulation and consumer protection before:

- Massachusetts legislative committees
- New Hampshire Energy Committee
- Rhode Island Energy Committee
- U.S. Senate
- U.S. House of Representatives
- New York State Assembly
- Pennsylvania legislative committees

